Reply to 'Clostridium difficile period of increased incidence in hospitals'

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The original definition of a Period of Increased Incidence (PII), i.e. 'two or more new cases (occurring >48 hours post admission, not relapses) in a 28-day period on a ward' has not changed. Since this definition was published, the diagnosis of *Clostridium difficile* infection (CDI) has been clarified to address the heterogeneity of testing methods that existed, and in the light of robust data on what constitutes a real case of infection (Department of Health, 2012; Planche et al., 2013). As a PII refers to cases of CDI there is no clear need at present to change the definition.

The authors present some data, based on a small sample size ($n=11$), to show that there is a divergence of practice over how individual trusts are defining PIIs, although all at least include cases that meet the stated definition. Those trusts who (additionally) are defining PIIs based on the first test (glutamate dehydrogenase (GDH) or polymerase chain reaction (PCR) for *C. difficile* toxin gene) in a two-stage algorithm for the diagnosis of CDI are in effect using a more sensitive (which may have advantages) but less specific (which may have disadvantages) definition of a PII. A key issue here is how often patients with diarrhoea who are only GDH or PCR positive may be a source of *C. difficile* transmission. We have two ongoing studies that are attempting to answer this question, one of which ('CD Link') is funded by Public Health England and is being carried out with at least five NHS trusts in England.

Notably, we have already demonstrated (in two centres in England) that, outside of the outbreak setting, CDI cases are now uncommonly linked to previous CDI cases; i.e. when strains are compared between cases they usually do not match (Eyre et al., 2013; Martin et al., 2013). This implies that transmission of *C. difficile* between CDI cases (directly or indirectly) is not the usual explanation for acquisition of the bacterium. There are multiple other potential sources of *C. difficile*, and one of these is patients with recognised diarrhoea who are sampled and found to harbour *C. difficile*. Until we have evidence to determine the contribution of the latter (and other potential sources) to *C. difficile* transmission, it would be unwise to change the definition of a PII.

In particular, there is a distinct possibility that using a modified definition of a PII (i.e. based on the first test in a two-stage algorithm for the diagnosis of CDI) will not be sufficient to capture all the main sources of *C. difficile* in the healthcare setting. This is why in its 2014–15

guidance, NHS England noted, 'Further improvement on the current position is likely to require a greater understanding of the individual causes of CDI cases, in order to understand if there were any lapses in the quality of care provided in each case, and if so, to take appropriate steps to address any problems identified' (NHS England, 2014). It is likely that this process will need to include a greater focus on the optimisation of the investigation and management of diarrhoea. It is anticipated that further guidance on such issues will follow soon. It is important to emphasise that if patients with diarrhoea are not investigated appropriately then there is a potential risk of suboptimal treatment and risk of transmission of *C. difficile* to other patients. In this context, it has been noted by NHS England that 'reported numbers of cases may provide false assurance of minimisation of risk of CDI in patients and/or transmission of *C. difficile* between patients' (NHS England, 2014).

Finally, the authors note that their *C. difficile* culture-negative rates for faecal samples that were only PCR positive as compared with those found to be PCR and toxin positive were 22% vs. 4% respectively. This observation implies a lower *C. difficile* transmission risk for patients who have 'first test only' positive faecal samples (assuming that the results reflect true differences in *C. difficile* burden, as opposed to false-positive/negative results). The studies referred to above will also shed more light on this hypothesis.

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